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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/591,277	06/09/2000	Bowie G. Keefer	145402	3353

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KLARQUIST SPARKMAN, LLP
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EXAMINER

LANGEL, WAYNE A

ART UNIT	PAPER NUMBER
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1754

DATE MAILED: 12/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/591,277	Applicant(s) KEEFER ET AL.	
	Examiner Wayne Langel	Art Unit 1754	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 October 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-68 is/are pending in the application.
- 4a) Of the above claim(s) 4-11, 13-15 and 29-68 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 12 and 16-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 June 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>9-13-00, 7-21-04, 12-26-01</u> | 6) <input type="checkbox"/> Other: _____ |

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Applicants' traverse of the restriction requirement has been considered, but is not deemed persuasive.

Applicants' argument, that there is no indication from the claim language that the apparatus of claims 29 and 38 could be used with a liquid in the reaction space, is not convincing, since the process as claimed can be practiced by another and materially different apparatus, such as one which does not include compression means or expansion means cooperating with the stator. Accordingly the restriction requirement is made FINAL.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 12 and 16-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over either Keefer '903 or Keefer '121 in view of Keefer et al '050. Keefer '903 and Keefer '121 both disclose both disclose gas phase chemical reactions conducted inside an open loop Stirling cycle apparatus, wherein adsorbent surfaces are associated with the thermal regenerators of the Stirling cycle apparatus, so that pressure swing adsorption separation of reactant and product gas species maybe achieved in response to cyclic variations of flow and pressure within the apparatus. (See the Abstract of each reference.) Keefer '903 and Keefer '121 both disclose that the method may be employed for the steam reforming of hydrocarbons. (See col. 1, lines 18-22 of Keefer '121, and, and col. 1, lines 13-19 of Keefer '903. The difference between the processes disclosed by Keefer '903 and Keefer '121, and that recited in applicants' claims, is that Keefer '903 and Keefer '121 do not disclose that the gas mixture containing the reactant and product components should be contacted with the adsorbent material in flow paths extending between first and second valve faces in a rotor, and that the rotor should be rotated at a rotational speed so as to establish cyclic fluid communication for each of the flow paths through the first and second valve faces in a cyclic sequence. Keefer et al '050 discloses PSA separation of a feed gas mixture within an apparatus having a single prime mover powering a feed

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compressor for one or multiple rotary PSA modules in parallel, each module including a rotor with a large number of angularly spaced adsorber elements, with valve surfaces between the rotor and a stator. (See the Abstract and col. 6, lines 9-65.) It would be obvious to employ the modular PSA system of Keefer et al '050 in the process of either Keefer '903 or Keefer '121, since the processes of Keefer '903 and Keefer '121 both require PSA systems for the chemical reaction, and it would be expected that the system of Keefer et al '050 could be employed in any known or conventional process which requires PSA.

Claims 1-3, 12 and 16-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over either Keefer '903 or Keefer '121 in view of Petit et al. Keefer '903 and Keefer '121 both disclose both disclose gas phase chemical reactions conducted inside an open loop Stirling cycle apparatus, wherein adsorbent surfaces are associated with the thermal regenerators of the Stirling cycle apparatus, so that pressure swing adsorption separation of reactant and product gas species maybe achieved in response to cyclic variations of flow and pressure within the apparatus. (See the Abstract of each reference.) Keefer '903 and Keefer '121 both disclose that the method may be employed for the steam reforming of hydrocarbons. (See col. 1, lines 18-22 of Keefer '121, and, and col. 1, lines 13-19 of Keefer '903. The difference between the processes disclosed by Keefer '903 and Keefer '121, and that recited in applicants' claims, is that Keefer '903 and Keefer '121 do not disclose that the gas mixture containing the reactant and product components should be contacted with the adsorbent material in flow paths extending between first and second valve faces in a rotor, and that the rotor should be rotated at a rotational speed so as to establish cyclic fluid communication for each of the flow paths through the first and second valve faces in a cyclic sequence. Petit et al disclose a rotary device including a plurality of vertical prismatic sectors mounted on a first annular plate comprising two arrays of gas passages which

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communicate with the outer and inner collectors of respective sectors. (See the Abstract and col. 2, lines 29-64.) It would be obvious to employ the rotary device of Petit et al in the process of either Keefer '903 or Keefer '121, since the processes of Keefer '903 and Keefer '121 both require PSA systems for the chemical reaction, and it would be expected that the rotary device of Petit et al could be employed in any known or conventional process which requires PSA.

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-3, 12 and 16-28 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-92 of U.S. Patent No. 6,406,523 in view of either Keefer '903 or Keefer '121. It would be obvious from either Keefer '903 or Keefer '121 to employ the rotary module recited in the claims of US 6,406,523 in the steam reforming of hydrocarbons, since it would be expected

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that the system of US 6,406,523 could be employed in any process in which a PSA system is required.

Claims 1-3, 12 and 16-28 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-92 of U.S. Patent No. 6,051,050 in view of either Keefer '903 or Keefer '121. It would be obvious from either Keefer '903 or Keefer '121 to employ the PSA process recited in the claims of US 6,051,050 in the steam reforming of hydrocarbons, since it would be expected that the system of US 6,051,050 could be employed in any process in which a PSA system is required.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-3, 12 and 16-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 1, steps (d) and (e), it is indefinite as to whether the gas may be both supplied to and withdrawn from the first valve face, or both supplied to and withdrawn from the second valve face, or whether the claim requires that the gas be withdrawn from the second valve face if supplied to the first valve face, or withdrawn from the first valve face if supplied to the second valve face. In claim 23, "such as methane" renders the scope of the claim vague and indefinite, since it is not clear whether the claim embraces any hydrocarbon, or is limited to methane.

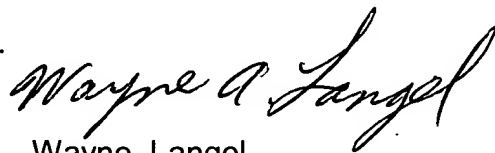
The other references are made of record for disclosing various PSA processes.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wayne Langel whose telephone number is 571-272-1353. The examiner can normally be reached on Monday through Friday, 8 am - 3:30 pm Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Wayne Langel
Primary Examiner
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